REMARKS

Claims 1-11 are all the claims pending in the application. By this Amendment, Applicant editorially amends claim 1-6 to fix minor informalities. Since such amendments are made to correct minor, basic elements, Applicant respectfully submits that that they do not narrow the scope of the claims and do not raise any Festo implications. The amendments to claims 1-6 were not made for reasons of patentability.

Preliminary Matters

Applicant thanks the Examiner for acknowledging the claim for priority under 35 U.S.C. § 119, and for acknowledging the receipt of a certified copy of the priority document.

Applicant also acknowledges that the Examiner has considered the references cited on form PTO/SB/08 A & B submitted with the Information Disclosure Statement filed on November 13, 2003.

The Examiner, however, did not indicate that the formal Drawings are accepted. Applicant respectfully requests the Examiner to acknowledge acceptance of the formal Drawings filed on November 13, 2003.

Claim Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,119,247 to Obayashi et al. (hereinafter "Obayashi") in view of U.S. Patent No. 5,014,336 to Grassl et al. (hereinafter "Grassl") and claims 10 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Obayashi and Grassl in view of JP

11-136913 Asao et al. (hereinafter "Asao"). Applicant respectfully traverses these rejections in view of the following comments.

Of the rejected claims, only claim 1 is independent. Independent claim 1 recites a number of unique features including:

> an electrical power converter which performs as a rectifier when said rotary machine is operated as a generator, and performs as an inverter when said rotary machine is operated as a motor; and
>
> a control device controlling said electrical power converter, thereby, when said rotary machine is operated as a motor, said control device controls said electrical power converter so as to restrict the armature current at the time of low speed rotation.

The Examiner alleges that Obayashi teaches a converter as set forth in claim 1. The Examiner, however, acknowledges that Obayashi fails to teach or suggest control device as set forth in claim 1. Yet, the Examiner further alleges that Grassl teaches control device as set forth in claim 1 (*see* page 2 of the Office Action). Applicant has carefully studied the combined teachings of Obayashi and Grassl and Applicant respectfully submits that Obayashi and Grassl, taken alone or in any conceivable combination, fail to teach or suggest at least the converter and the control device as set forth in claim 1.

By way of an example, in the exemplary, non-limiting embodiment of the present invention, a generator motor is a synchronous rotary machine composed of three phase armature windings and a field winding. In addition, the generator motor has permanent magnets for additional magnetic flux. The generator motor serves as both a starting motor at the starting stage of the vehicle and as a charging generator after the starting of the engine. The converter serves to convert the generator motor from starter motor to charging generator and vice versa.

The converter is a three phase full wave bridge circuit composed of switching elements and diodes. Both are controlled by the control device. The machine is full wave rectified by diodes when the machine performs as a generator and when the machine is operated as a motor, the converter serves as an inverter. When the machine is operated as a motor, the control device controls the converter so as to restrict the armature current at the time of low speed rotation. This passage is provided by way of an example only and is not intended to limit the scope of the claims in any way.

Obayashi, on the other hand, teaches a drive control apparatus for an electric synchronous machine. The machine is composed of three-phase armature windings and field winding (see Abstract; Fig. 1; col. 3, lines 1 to 4). The control apparatus is composed of a controller, inverter 200, battery unit, and field control circuit (Fig. 1; col. 3, lines 5 to 6). The inverter 200 has main input terminals connected to the battery and output terminals connected to the windings of the motor. In addition, the inverter 200 also has input terminals connected to the controller and an insulated gate type-bipolar transistor module (Fig. 2; col. 3, lines 17 to 35).

Grassl teaches an apparatus in a shunt-wound d.c. motor for driving centrifuges. The apparatus is for obtaining smooth acceleration by regulating the bottom speed range in accordance with a preset slope current and then accelerating the armature current with full excitation (see Abstract). The armature current is regulated with full field excitation during acceleration and during deceleration the field current is regulated with full armature current in accordance with a signal having a defined adjustable slope (col. 1, lines 50 to 55). In particular, Grassl teaches that the field windings 14 are connected to the control unit 16 via switch 15. The

switch 15 is used to reverse the polarity of the field current during the braking operation. The control unit 16 provides the field current to the field winding 14. The armature windings 12 are connected to the armature current control unit 22. The two control units 16 and 22 deliver a constant maximum current as required for full acceleration and braking (Fig. 1; col. 2, lines 8 to 33).

The Examiner contends that the inverter as taught in Obayashi is equivalent to the converter as set forth in claim 1 (see page 2 of the Office Action). Obayashi's inverter, however, is only used to drive the U, V, W windings (col. 3, lines 23 to 44). That is, in Obayashi, there is no teaching or suggestion that the inverter is used as a rectifier when the motor is used as a generator. Indeed, in Obayashi, the inverter is only used to drive the windings and not to rectify when the motor is used to charge the battery.

Moreover, as acknowledged by the Examiner, Obayashi does not teach or suggest control device that control the converter to restrict armature current at the time of low speed rotation. Grassl does not cure the deficient teachings of Obayashi. To begin, Grassl fails to teach or suggest a converter as set forth in claim 1. Moreover, Grassl only teaches that the field windings 14 are connected to the control unit 16 via switch 15. The control unit 16 provides the field current to the field winding 14. The armature windings 12 are connected to the armature current control unit 22. The two control units 16 and 22 deliver a constant maximum current as required for full acceleration and braking (Fig. 1; col. 2, lines 8 to 33). No where, however, does Grassl teach or suggest that the control unit restricts armature current at the low speed rotation. In Grassl, the armature current is regulated with full field excitation during acceleration and during

deceleration the field current is regulated with full armature current in accordance with a signal having a defined adjustable slope (col. 1, lines 50 to 55). In fact, Grassl only teaches that the control unit 22 delivers constant armature current and not that it restricts armature current at the low speed rotation.

Therefore, "an electrical power converter which performs as a rectifier when said rotary machine is operated as a generator, and performs as an inverter when said rotary machine is operated as a motor; and a control device controlling said electrical power converter, thereby, when said rotary machine is operated as a motor, said control device controls said electrical power converter so as to restrict the armature current at the time of low speed rotation," as set forth in claim 1 is not taught or suggested by the combined teachings of Obayashi and Grassl.

Moreover, claim 1 recites: "permanent magnets for magnetizing said field magnetic poles" and "to restrict the armature current at the time of low speed rotation." At least these two unique features of the present invention create a synergistic effect. MPEP § 716.02(a) states that "[a] greater than expected result is an evidentiary factor pertinent to the legal conclusion of obviousness ... of the claims at issue. *In re Corkill*, 711 F.2d 1496, 226 USPQ 1005 (Fed. Cir. 1985)...evidence of a greater than expected result may also be shown by demonstrating an effect which is greater than the sum of each of the effects taken separately (*i.e.*, demonstrating synergism)." For instance, by combining the two unique features the capacity of the switching elements can be reduced and the cooling system may be simplified. Examples of the synergistic effect are further described on page 7, line 17 to page 8, line 13. In short, "the permanent magnets for magnetizing said field magnetic poles" and "to restrict the armature current at the

time of low speed rotation" as set forth in claim 1 create a synergistic effect negating obviousness over the combined teachings of Obayashi and Grassl.

Together the combined teachings of these references would not have and could not have led an artisan of ordinary skill in the art to the subject matter recited in claim 1. For at least these exemplary reasons claim 1 is patentable over the combined teachings of Obayashi and Grassl. Consequently, Applicant respectfully requests the Examiner to withdraw this rejection of claim 1. Claims 2-9 are patentable at least by virtue of their dependency on claim 1.

In addition, claim 7 recites: "wherein the armature current at the time of low speed rotation is limited to 300 amperes or below." The Examiner alleges that the feature of claim 7 is nothing more than a routine range and does not accord it patentable weight (see pages 3-4 of the Office Action). As explained in greater detail above, neither Obayashi nor Grassl recognize benefits of or teach restricting the armature current at the time of low speed rotation in a motor used as a generator and a starting motor. MPEP § 2144.05 states:

> **A particular parameter must first be recognized as a result-effective variable**, i.e., a variable which achieves a recognized result, **before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation**. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore **the parameter optimized was not recognized in the art to be a result-effective variable**.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy), emphasis added.

Similar to the above noted case, neither Obayashi nor Grassl recognize the benefits of restricting the armature current at the time of the low speed rotation in a motor used as a generator and a starting motor. The Examiner acknowledges that Obayashi does not teach or suggest restricting the armature as set forth in the independent claim 1, for example. Grassl only teaches delivering a constant maximum current as required for full acceleration and braking, as explained in greater detail above with reference to claim 1. That is, Grassl, also fails to recognize restricting the armature current at a time of low speed rotation, instead a constant maximum current is delivered and not restricting the armature current at the time of low speed rotation

Since, the combined teachings of Obayashi and Grassl fails to recognize or disclose the restriction of the armature current during low speed rotation, the limit of 300 amperes or below is not a result-effective variable but rather a unique feature that should be accorded patentable weight. For at least this additional reason, Applicant respectfully submits that claim 7 is patentable over the combined teachings of Obayashi and Grassl.

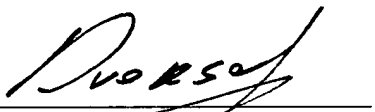
Finally, claims 10 and 11 are rejected as being obvious over the combined teachings of Obayashi, Grassl and Osao. Claims 10 and 11 depend on claim 1. Applicant has already demonstrated that the combined teachings of Obayashi and Grassl do not teach or suggest the unique features of claim 1. Osao is being cited only for its teachings of permanent magnets and as such clearly fails to cure the deficient teachings of Obayashi and Grassl (see page 4 of the Office Action). Therefore, at least by virtue of their dependency on claim 1, claims 10 and 11 are patentable over the combined teaching of Obayashi, Grassl and Osao. Applicant respectfully requests the Examiner to withdraw this rejection of claims 10 and 11.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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